



NMCI Industry Day

Converged Network Architecture

June 21, 2004



Agenda

- **Nortel Networks Introduction**
- **Convergence Architecture**
- **UK Network Case Study**
- **Summary**



Nortel Networks

- **Global customer base**
- **Serving more than 150 countries**
- **36,000 employees worldwide**
- **U.S. Government Agencies**
- **Over 180 Meridian SL 100's in U.S. military bases globally**
- **Millions of Meridian PBX's lines**
- **Long-haul and metro optical**
- **Data networking and security**



*Over 100 years
at the forefront
of major
technological
innovations in
telecom*



Nortel Networks

- **Research & Development**
 - **Heritage of innovation**
 - Digital switching
 - Optical networks
 - Convergence
 - **1/3 of employees are technologists**
 - Engineers
 - Designers
 - Scientists
 - **\$2B R&D investment annually**



Nortel Networks

Federal Solutions Team

- Dedicated Federal Organization
- Solutions design, implementation, and ongoing support services from Nortel and channel partners globally
- Capability of handling classified contracts
- Supporting EDS/NMCI voice initiative since July, 2003



Convergence Architecture: Putting the “Net” into NetForce!

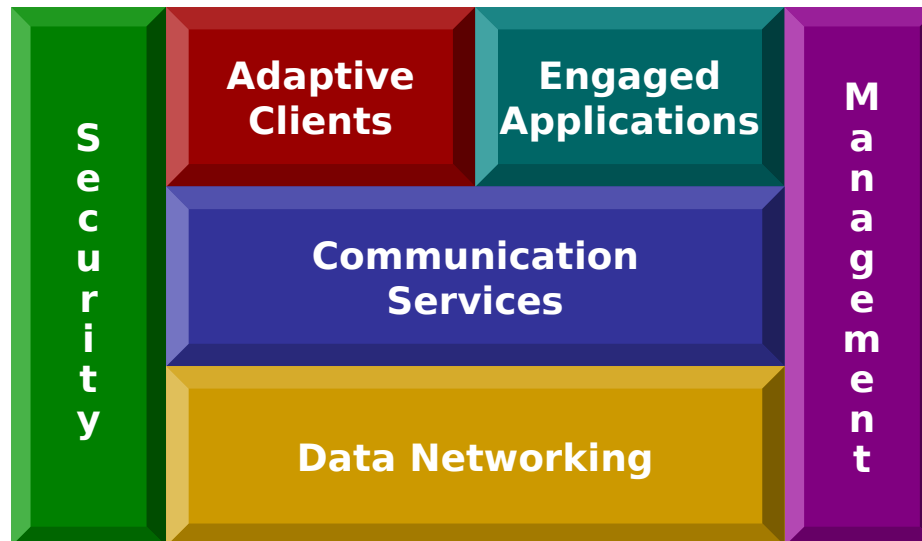


***“If you don’t like change,
you’re going to like
irrelevance even less.”***

General Eric Shinseki
U.S. Army Chief of Staff
*(Developed the very successful
“Army of One” Campaign)*



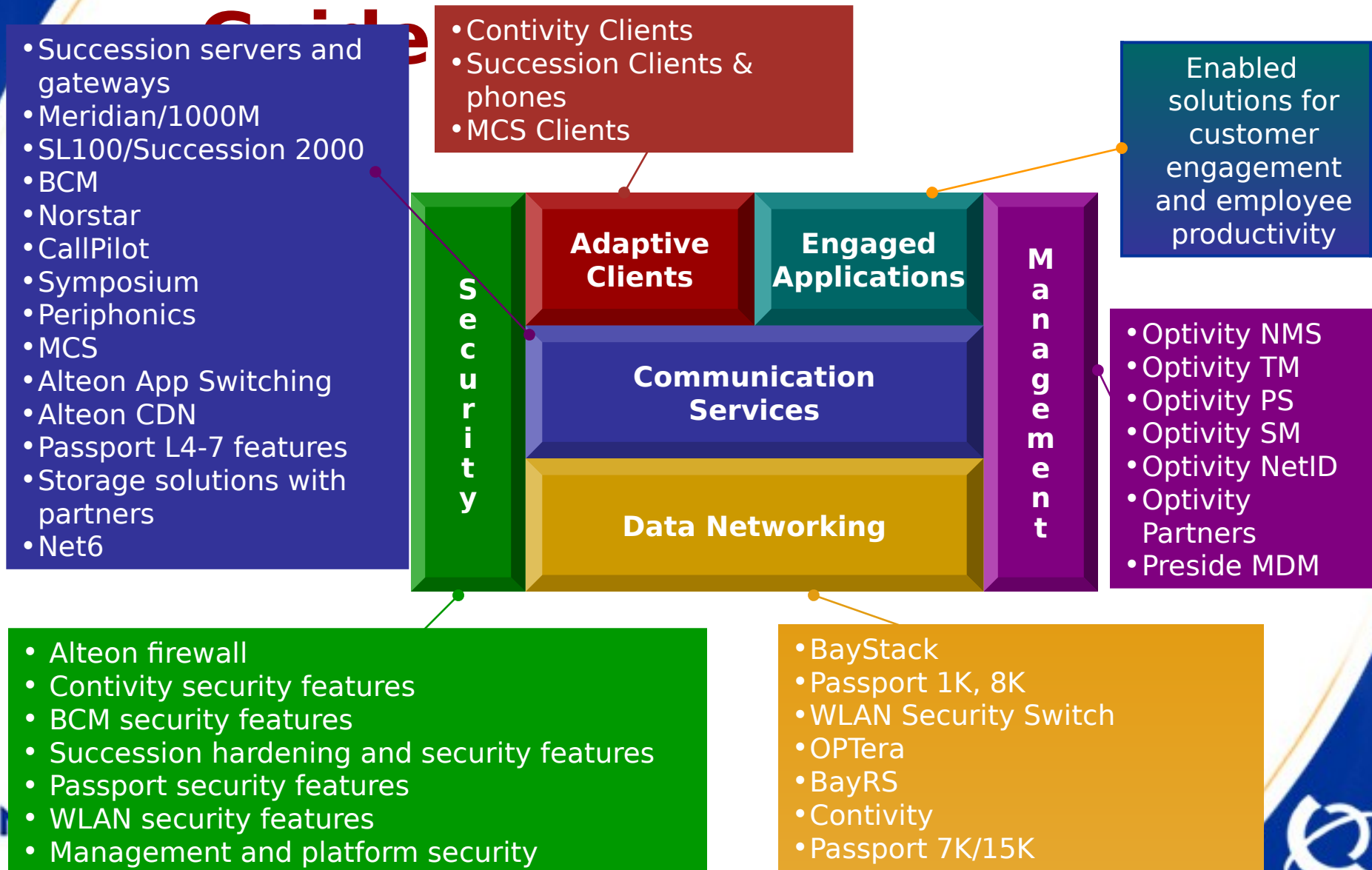
Converged Architecture



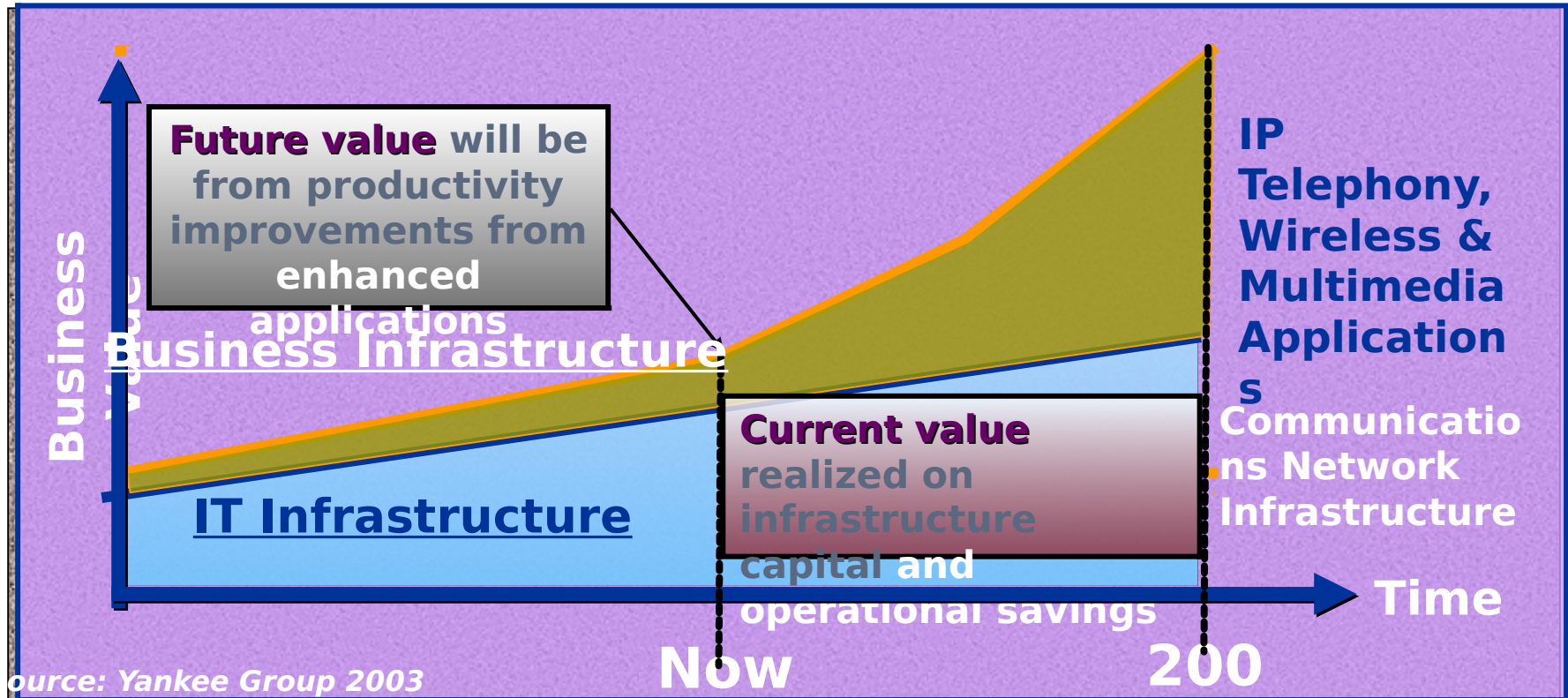
- Open Systems Compliant
- IP Network Centric
- One Network



Nortel Product Reference



Converged Networks Delivering Business Value...



Convergence Definitions

Convergence

As it applies to a communications provider, Convergence means:

- Using one physical medium to transport all media originating from any application
- Using one common Networking Layer intelligence protocol
- Ability to manage and provision applications and services from a single point
- Elastic service creation: Deploy service rapidly wherever and whenever required

As it applies to a communications user, Convergence means:

- Device and location agnostic communication: reach or be reached anywhere, anytime
- One physical device for telcom, data and video applications
- Lightning fast network response to dialtone, webtone,
- SLA adherence: Coverage, 24x7x365, Security, Throughput, QoS
- Generally, simplify their lives : “one converter for TV/VCR/DVD/Stereo/Spouse”



Nortel Understanding of Navy Convergence

Target Converged Architecture

- Evolutionary approach supporting any voice, video and data communications
- Migrate voice management into the NMCI GNOCs
- Consolidate and regionalizing voice assets
- Migrate current voice services switches to Voice over Packet technology
- Provide Navy capability to converge voice, video and data when and if required
- Eliminate the need to maintain dual network infrastructures, support staffs, pools of expertise, equipment facilities, management tools for voice and data.



Convergence Building Blocks

Application

- Military Unique TDM Voice
- Military Unique VoIP
- Multimedia Applications and Collaboration
- Non-real-time Data services

Network Consolidation (Network Elements)

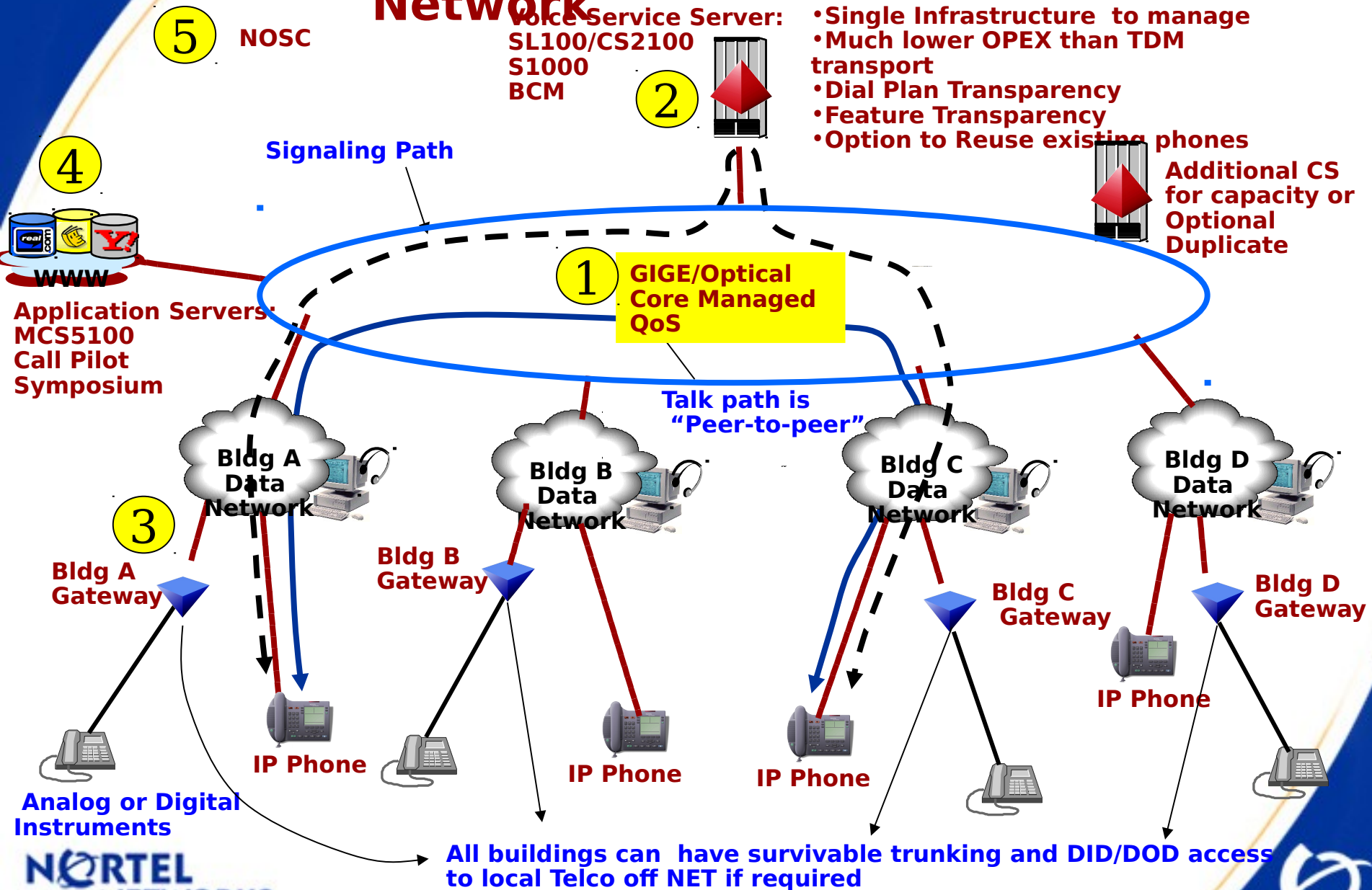
- OAM&P node reduction
- C2VG LAN/MAN/WAN

Converged Transport
(Physical Medium)
- Fiber / Optical (Layer 1)
- Layer 2 and 3 Data

**Converged Communications
End-To-End**

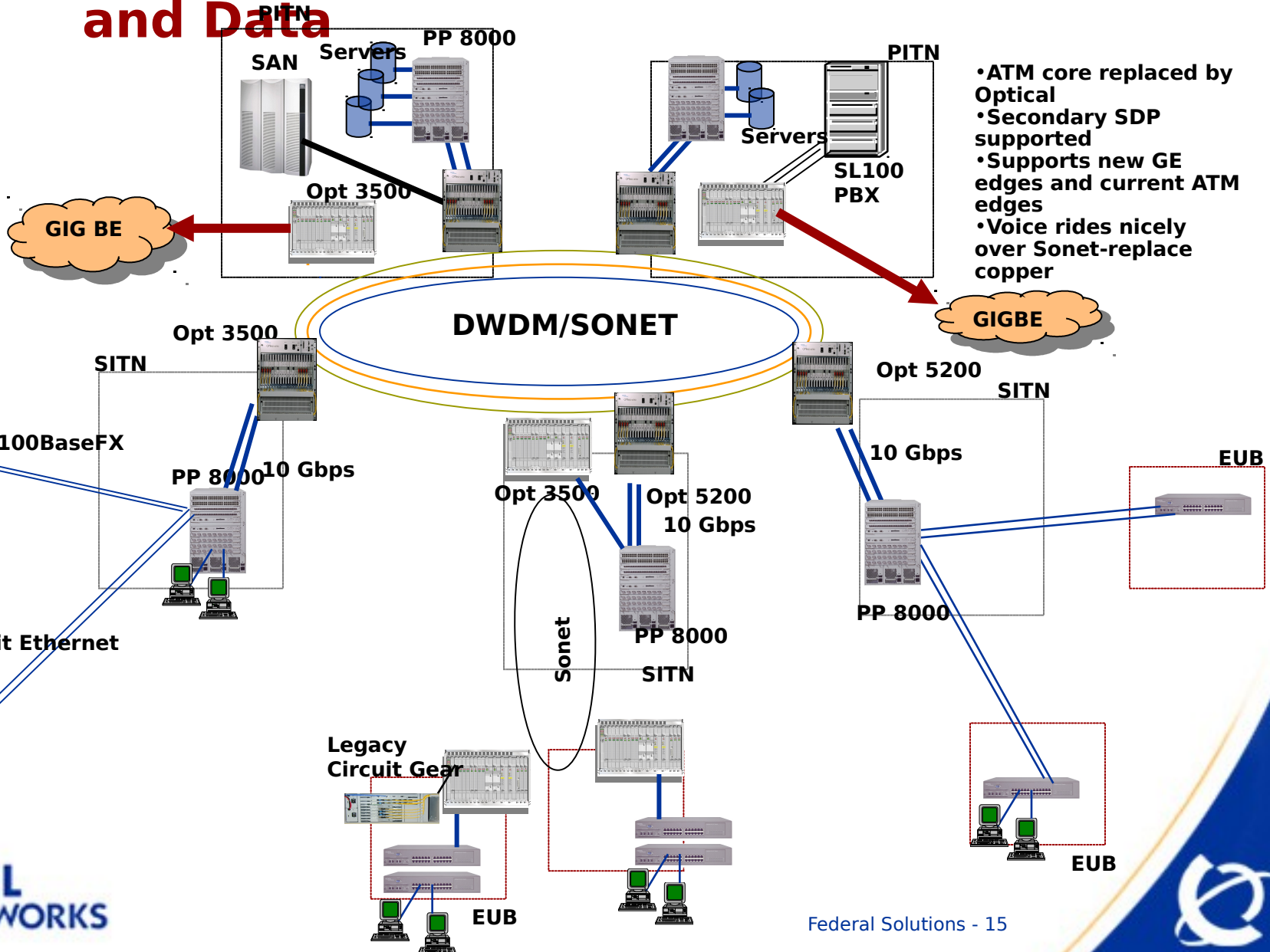


How To Build A Converged Network



How to Build a Converged Network: Single Transport For TDM, VoIP, Video and Data

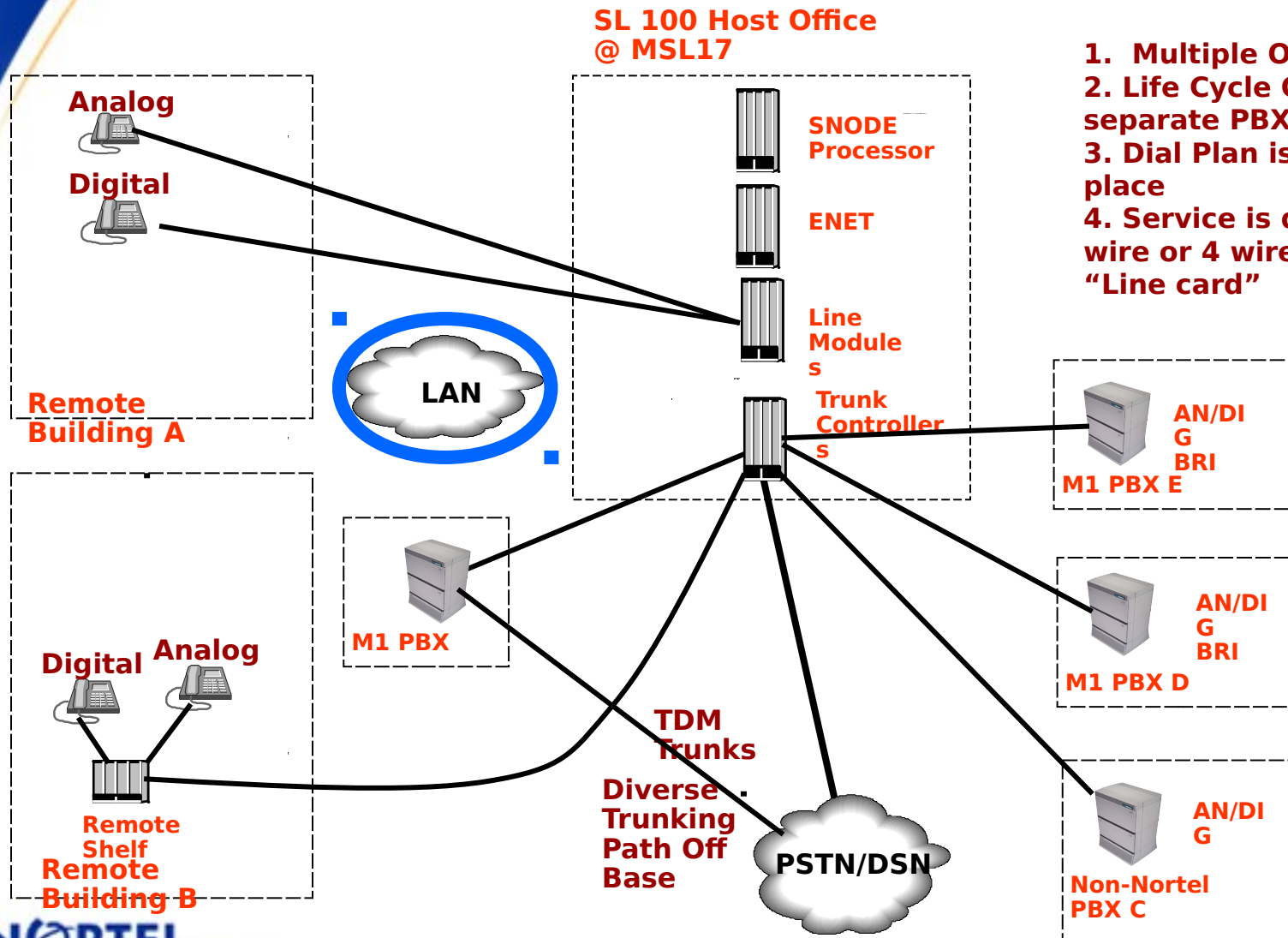
TCP/IP
Ethernet
SONET
Fiber



How to Build a Converged Network: Start point = Typical US Navy Base

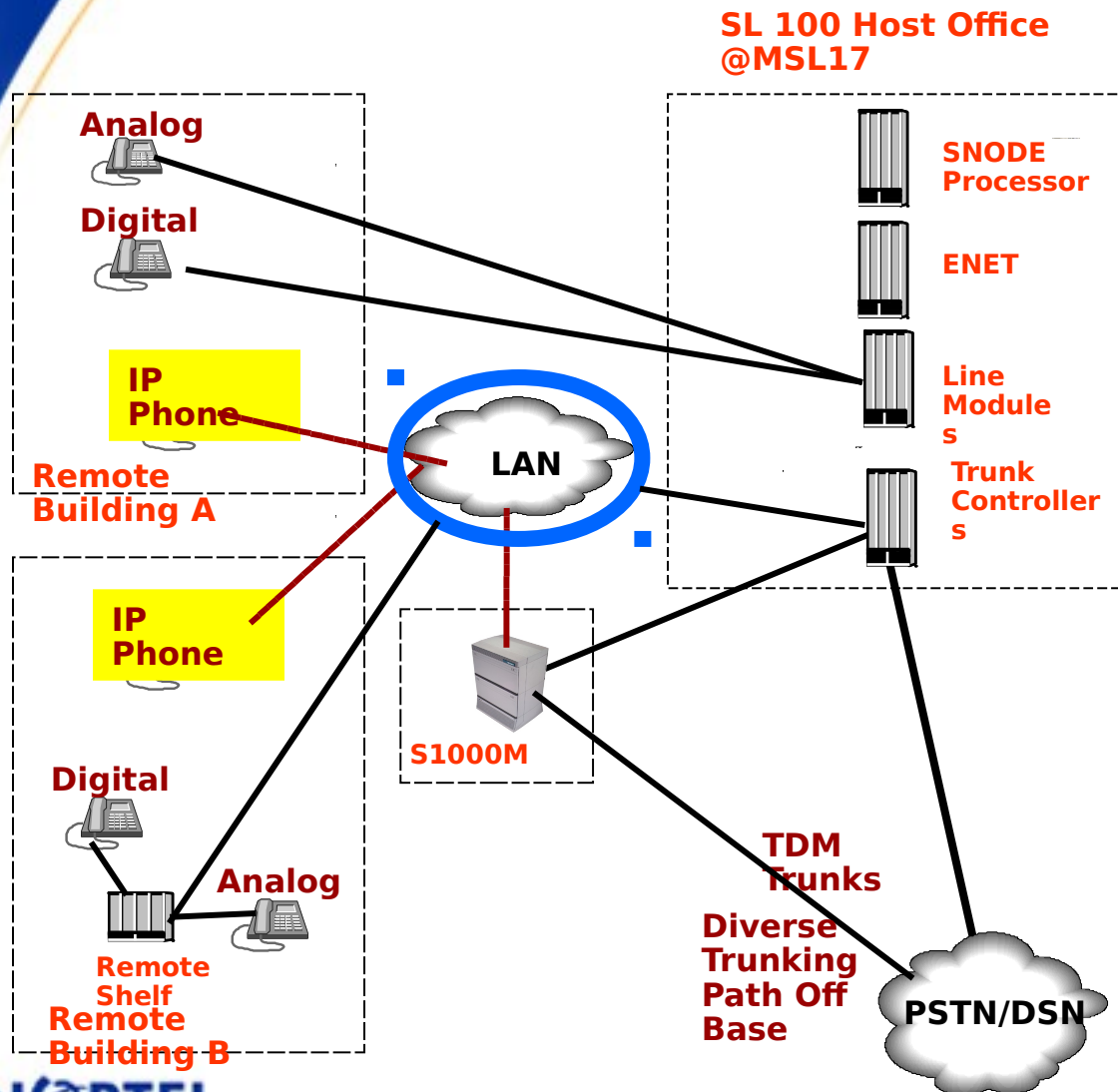
Attributes:

1. Multiple OAM&P NODES
2. Life Cycle Costs Tied to separate PBXs
3. Dial Plan is usually in place
4. Service is dependent on 2 wire or 4 wire umbilical to "Line card"

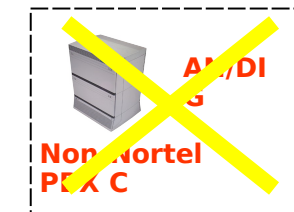
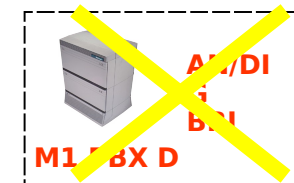
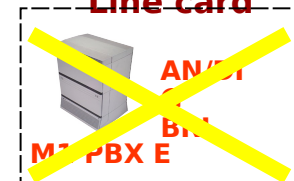


How to Build a Converged Network:

Step 1: IP Enabled and Consolidated Attributes:



1. Single OAM&P NODE
2. Life Cycle Costs Tied to BASE Telecom Switch
3. Dial Plan stays the same
4. Eliminate reduce PBXs using IP Phones
5. BRI directly off SL100 where possible. Otherwise retain small S1000M for BRI.
6. Service is dependent on 2 wire or 4 wire umbilical to "Line card"



Base Level Telecom Life Cycle Costs

Assumptions:

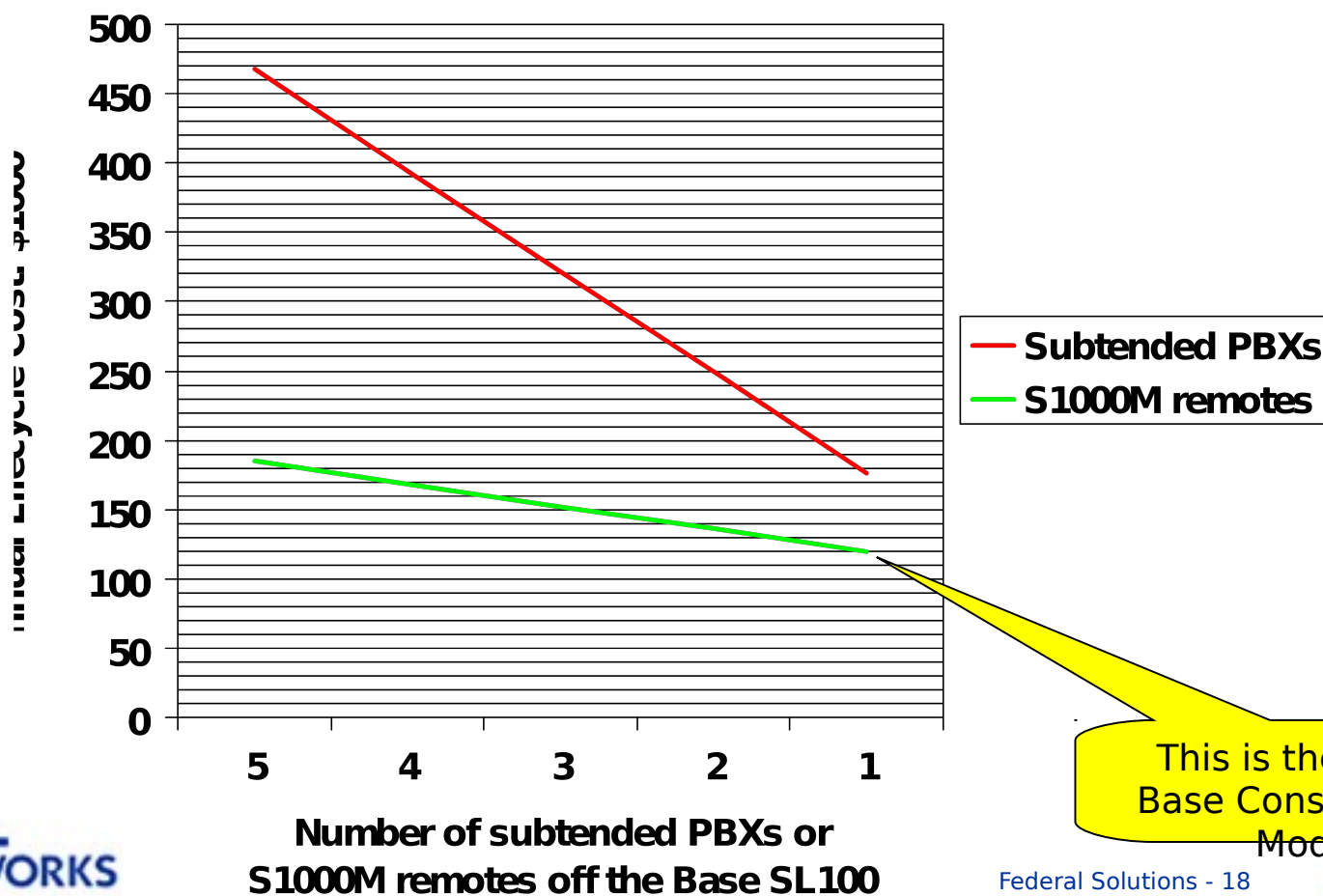
Typical US Navy SL100 Service contract \$66K/yr.

Typical US Navy M1 PBX (PBX1/SMEO) Service contract \$30 K/yr

Base SL100 Service contract will increase by 5% per subtended S1000M remote, for spares and training

Includes 1 JITC certified software upgrade per year.

Does not include any gating hardware required to complete software upgrade



S1000M Base Level Consolidation Projected Savings

Assumptions

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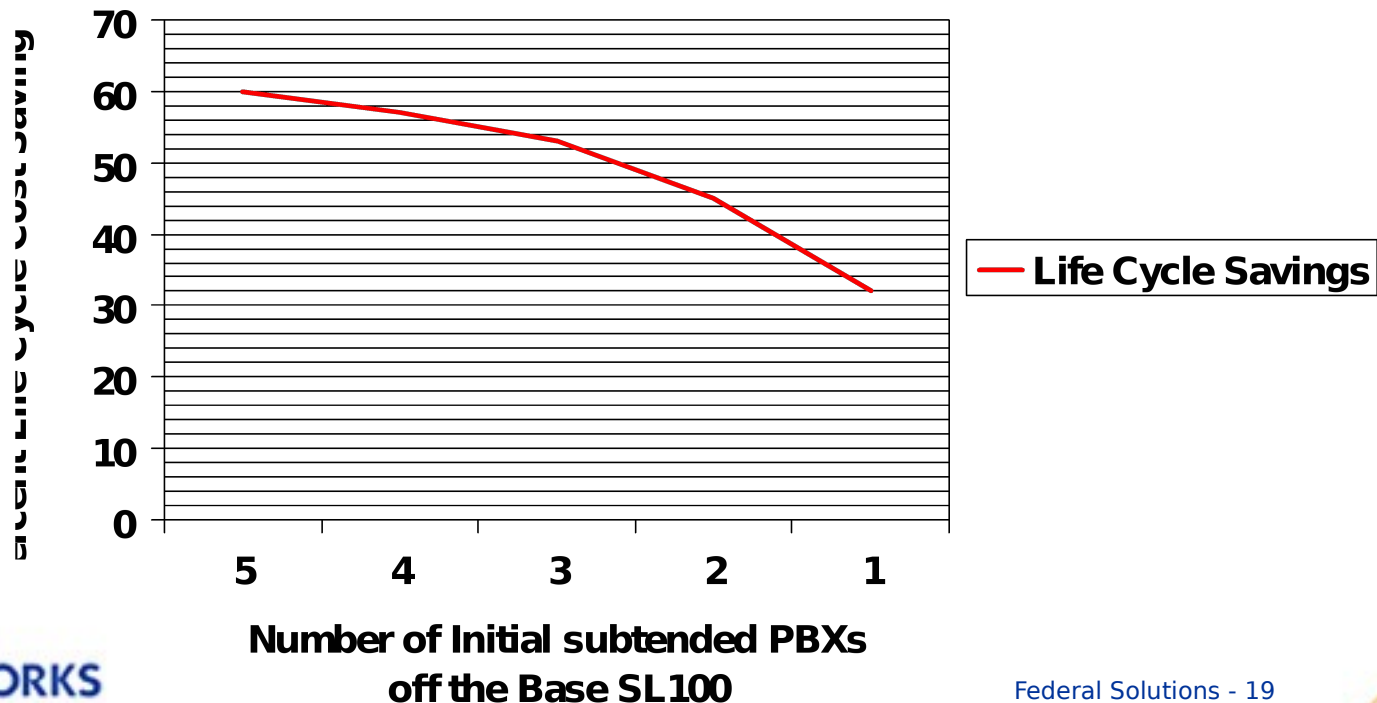
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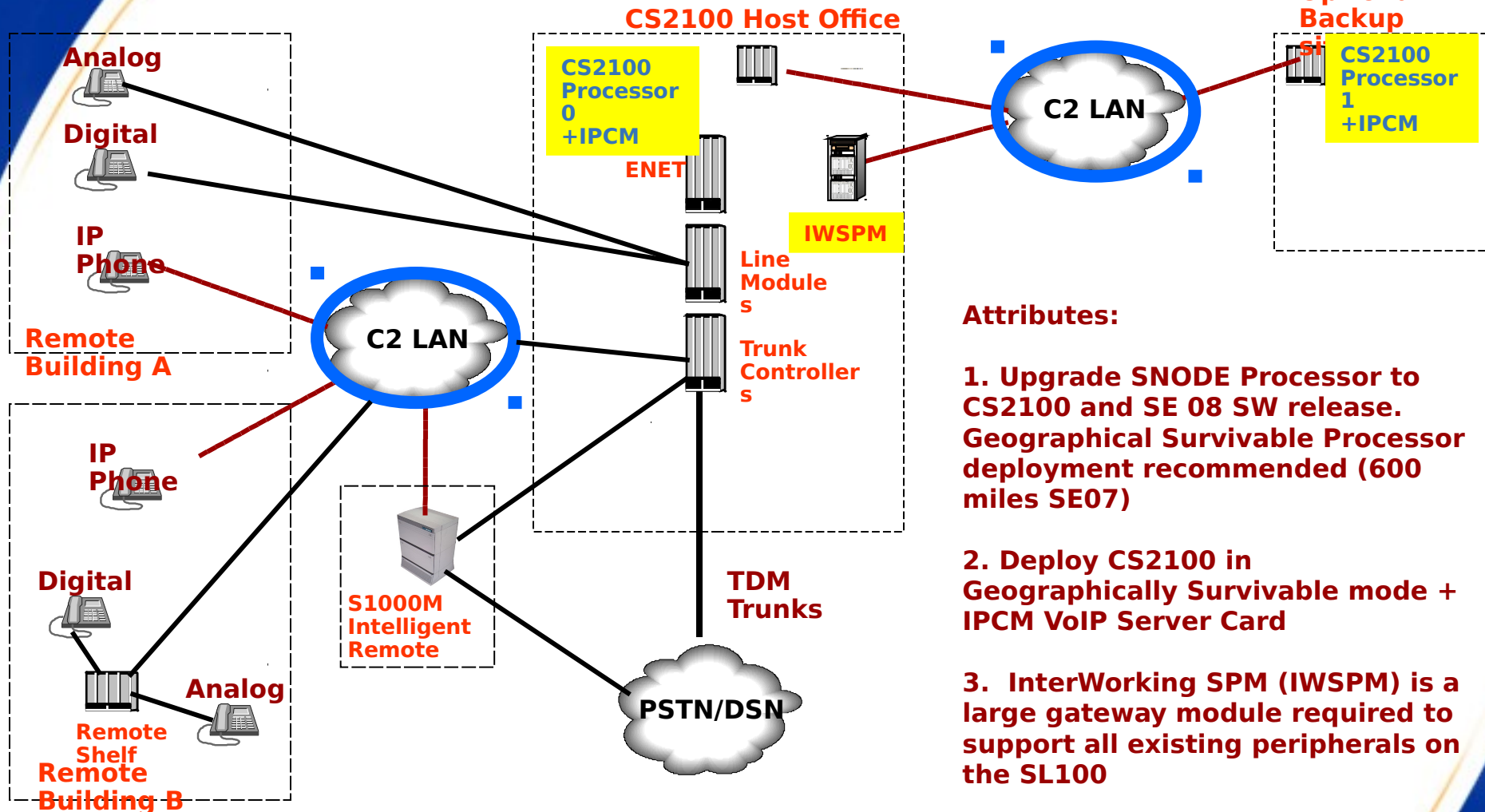
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Life Cycle Cost Savings vs Number of Initial Subtended PBXs



How to Build a Converged Network:

Step 2: Consolidate 2 sites-prepare for regionalization



NOTE: Both "C2 LAN" Clouds are the same BASE C2 LAN

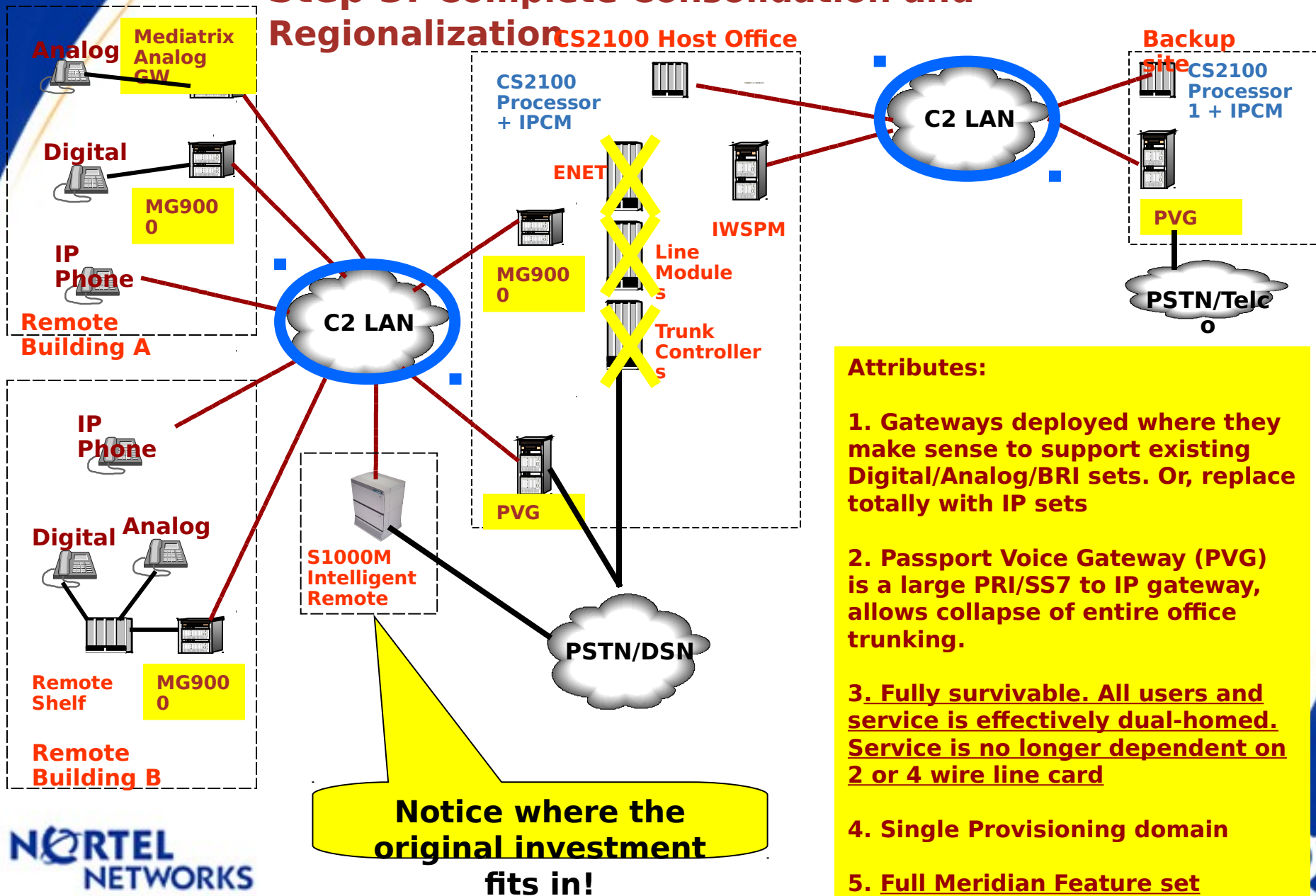
Attributes:

1. Upgrade SNODE Processor to CS2100 and SE 08 SW release. Geographical Survivable Processor deployment recommended (600 miles SE07)
2. Deploy CS2100 in Geographically Survivable mode + IPCM VoIP Server Card
3. InterWorking SPM (IWSPM) is a large gateway module required to support all existing peripherals on the SL100
4. Service is dependent on 2 wire or 4 wire umbilical to "Line card"
5. Single Provisioning domain

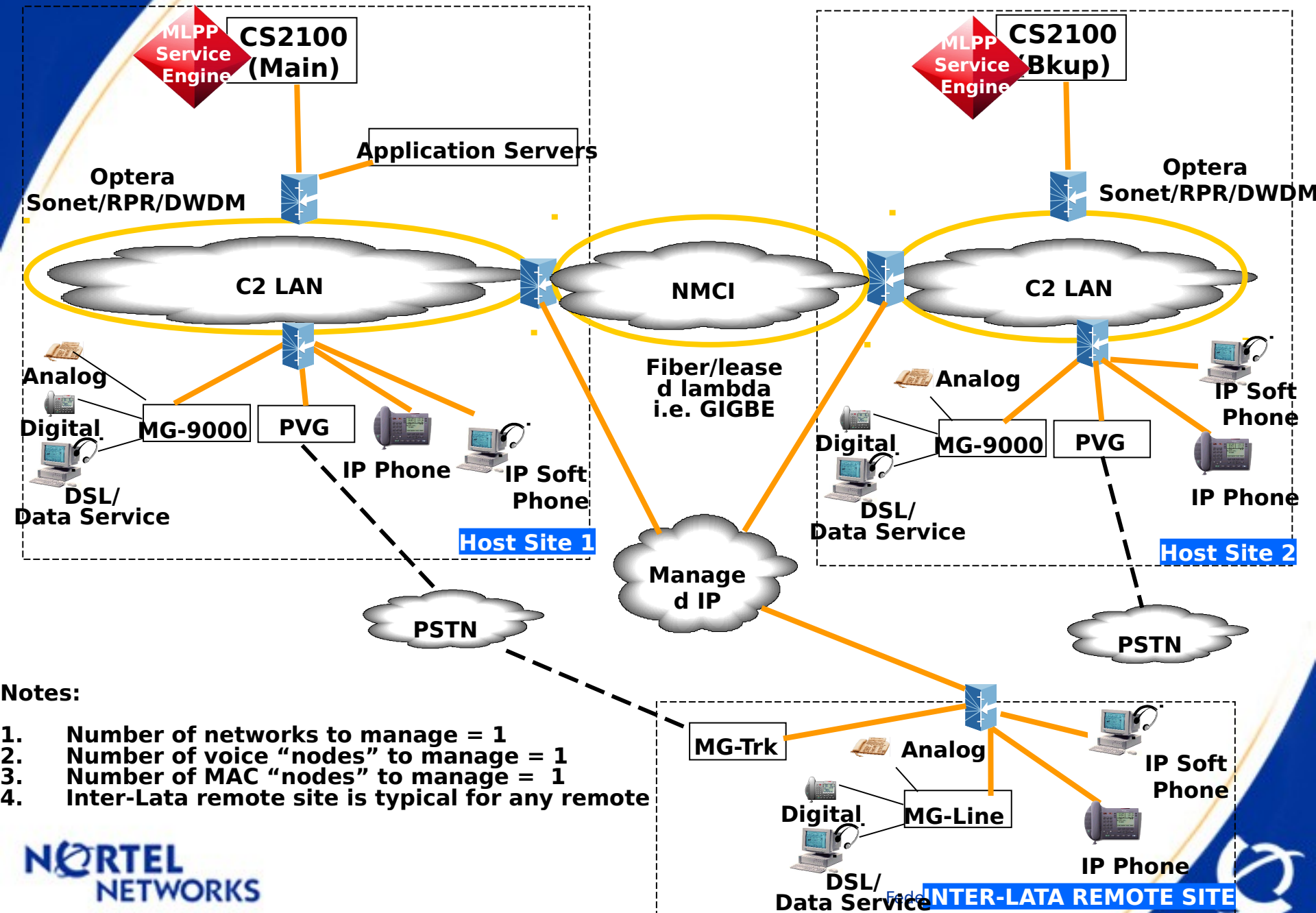


How to Build a Converged Network:

Step 3: Complete Consolidation and Regionalization



Step 4: US Navy Converged Regional Architecture -



Regionalization Study:
Applying Next Generation Military Robust
Converged Network to
DoD UK Network

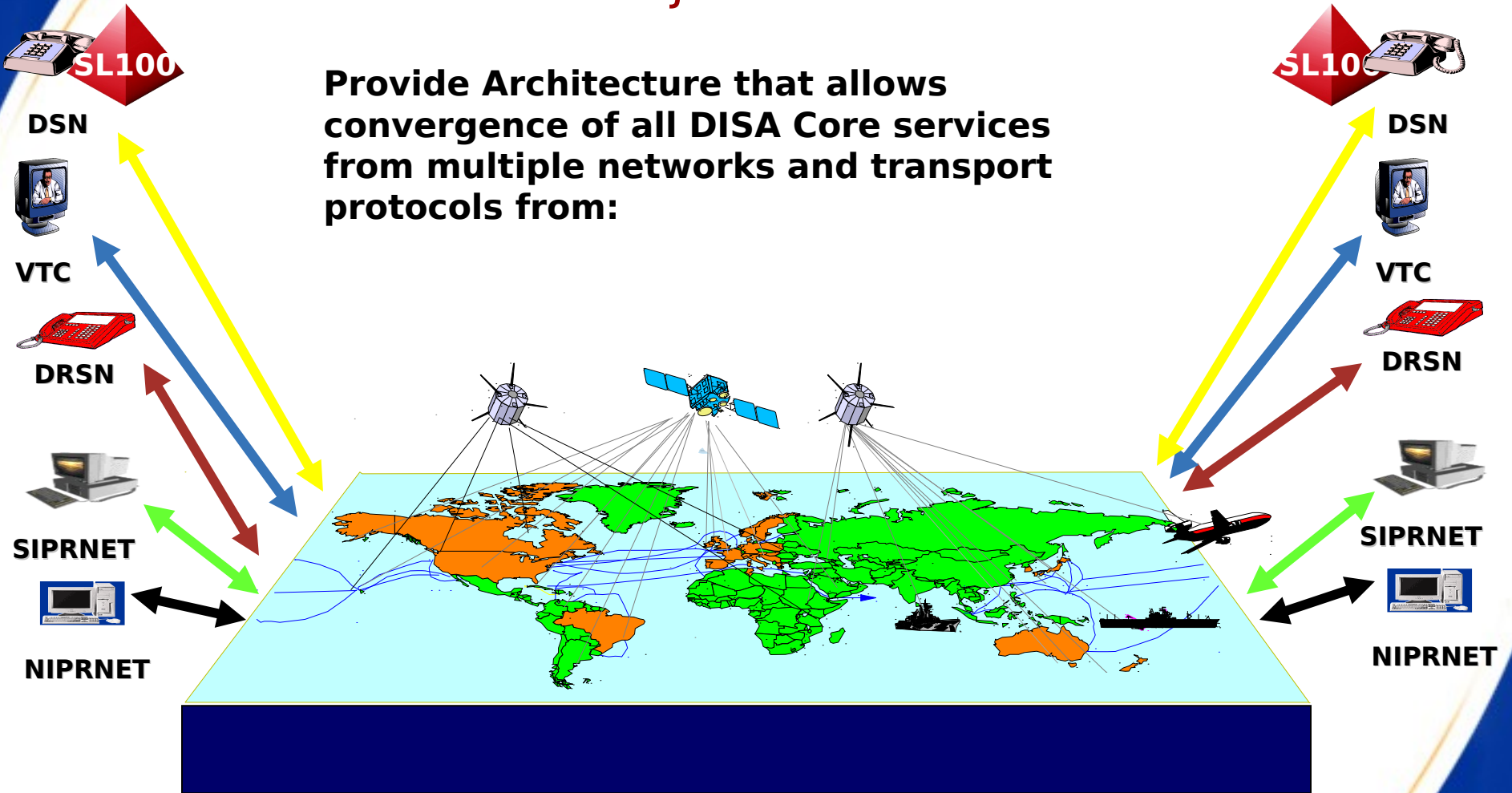


Existing Network Attributes

- Hierarchical and Nodal: follows $(N(N-1)/2)$ connection behavior
- Mostly disparate networks: one for Telecom and one for Data
- High OPEX and CAPEX related to TDM trunking and EO OA&M
- Reliable, Meets all Military Unique Functionality Requirements
- Survivability based on physical link connectivity
- Large investment in TDM end user instruments
- T1/PRI and/or ATM based transmission. SS7 AIN in theater
- Migrating to SONET based backbone in core



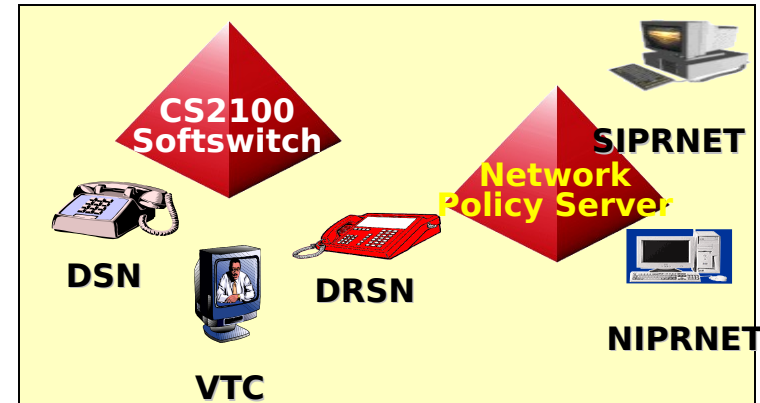
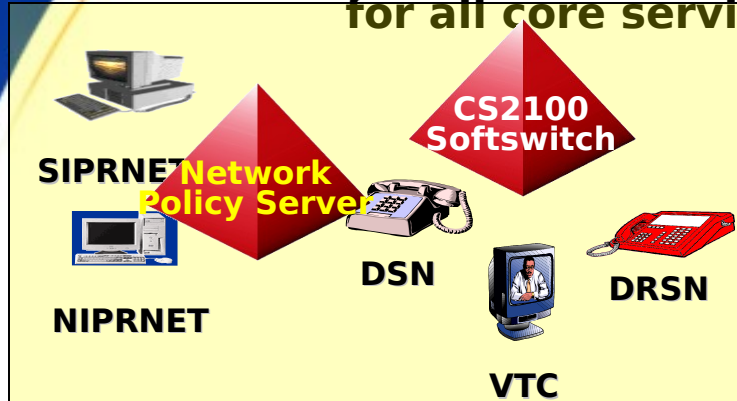
Task order Objective:



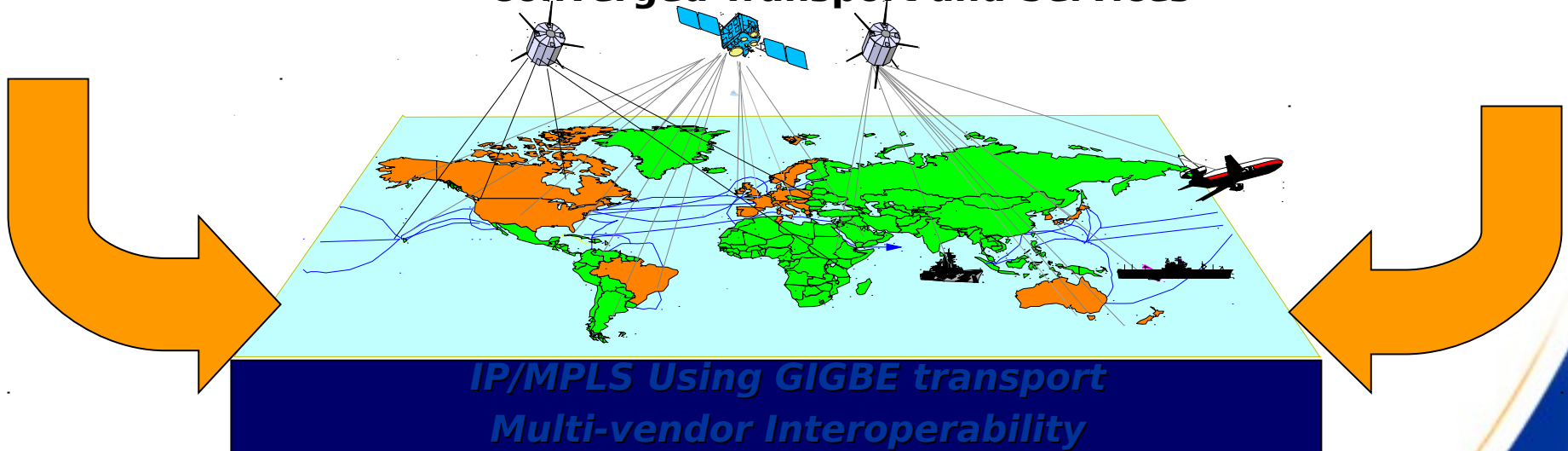
VTC - Video Teleconferencing DSN - Defense Switched Network NIPRNET - Non-secure Internet Protocol Router Network
DRSN - Defense Red Switch Network SIPRNET - Secret Internet Protocol Router Network

Task order Objectives:

One IP based end-to-end network,
supporting Assured Service delivery
for all core services



Converged Transport and Services



VTC - Video Teleconferencing **DSN** - Defense Switched Network **NIPRNET** - Non-secure Internet Protocol Router Network
DRSN - Defense Red Switch Network **SIPRNET** - Secret Internet Protocol Router Network

Summary

- **Converging data, voice and video onto one IP backbone saves money**
- **Opportunity to reduce FTS2001 utilization**
- **Positions Navy for future client based technologies**
 - Wireless LAN Voice
 - Soft Voice Clients
 - Unified Messaging

